

Biology 101: Human Biology



Chapter 10: Patterns of Inheritance Part 2
Dr. Venditti

Genetic Cross

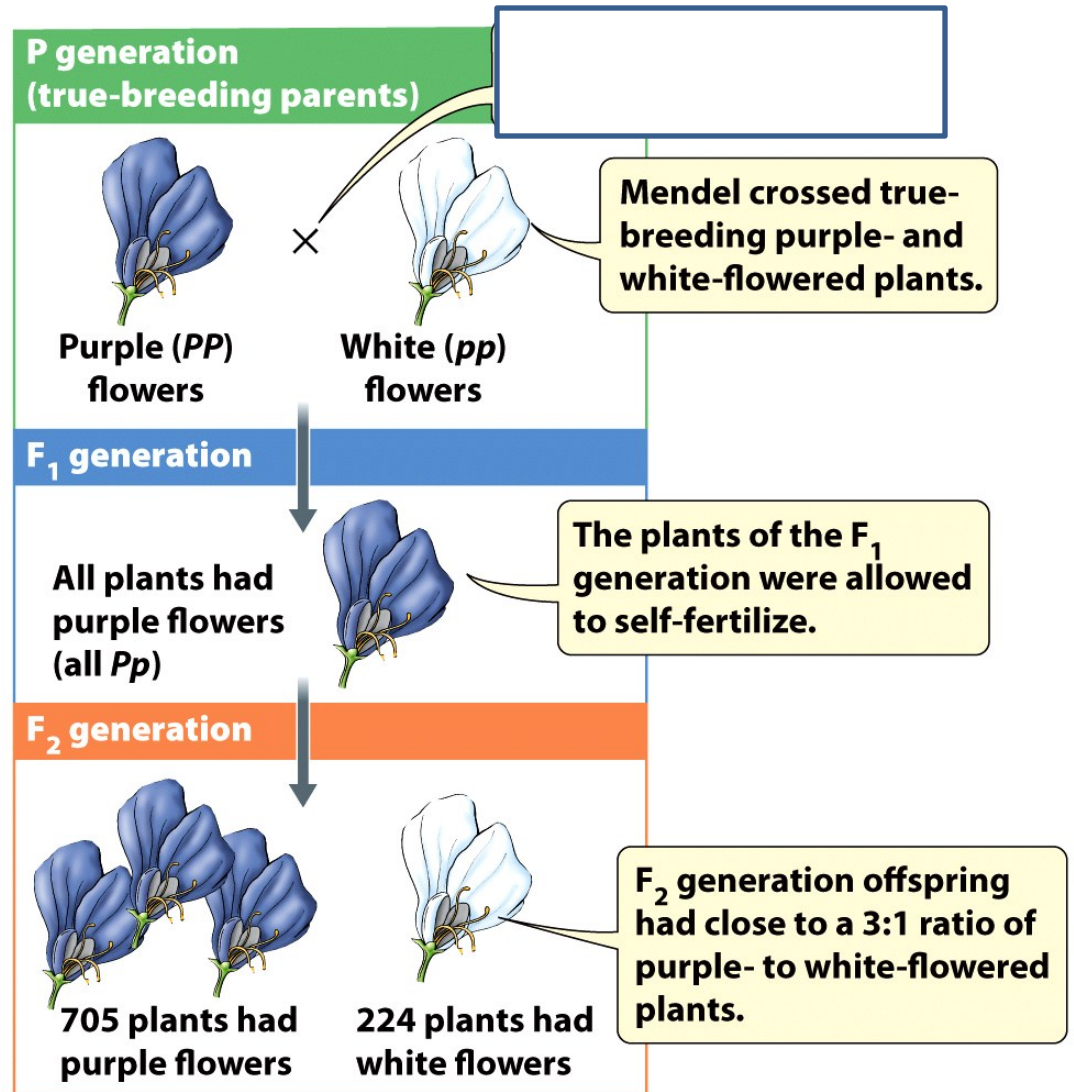
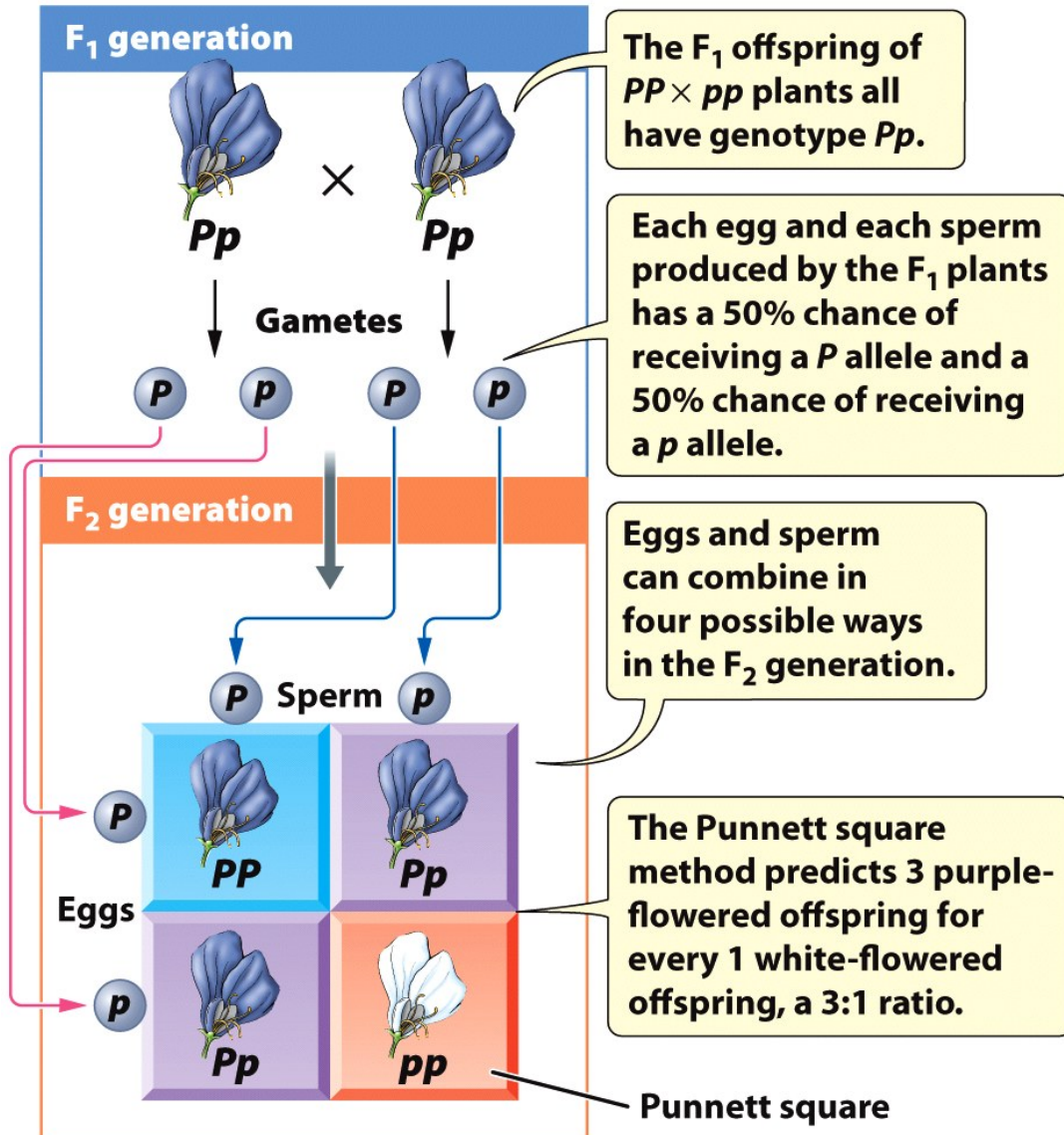


Figure 10.6 Discover Biology 4/e
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Mendel's 1st Law: Segregation

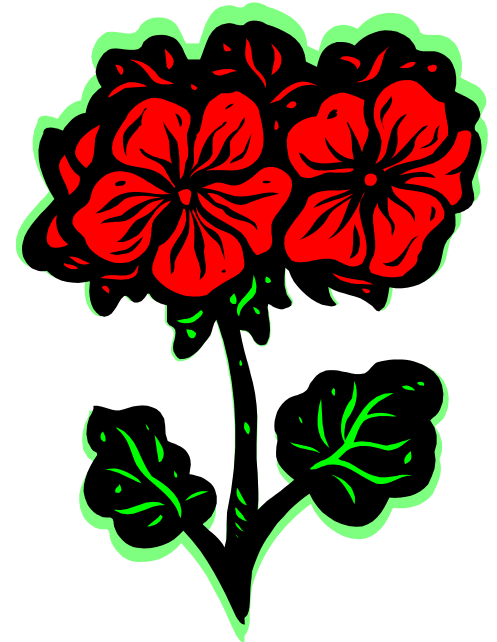


What's the genotypic ratio?

What's the phenotypic ratio?

Predicting offspring using a Punnett Square

Flower color in geraniums is coded for by the R gene. If red flowers are dominant to white flowers, predict the offspring of a cross between a plant that is heterozygous for red flowers and a plant with white flowers.

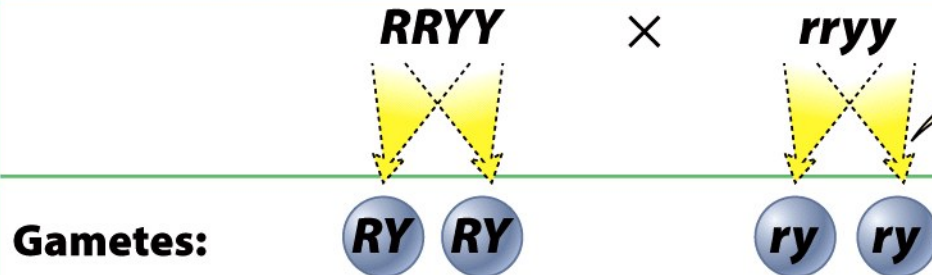


Mendel's 2nd Law: Independent Assortment

Parent genotypes in the first two-trait cross (P generation)

Parents with the *RRYY*, or *rryy*, genotype produce only one type of gamete: with genotype *RY*, or genotype *ry*.

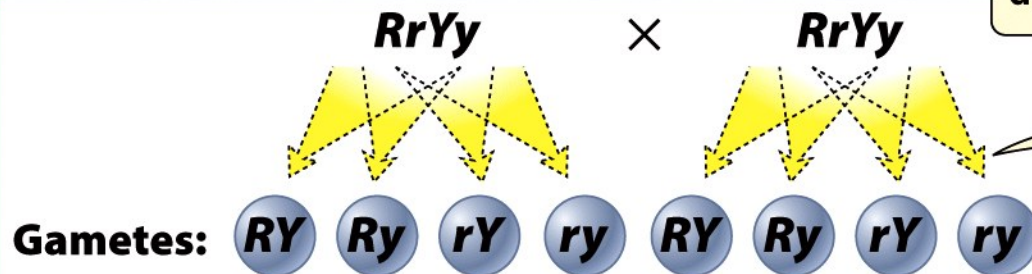
The dotted arrows trace all the ways in which alleles of the two genes can be combined in the gametes during meiosis.



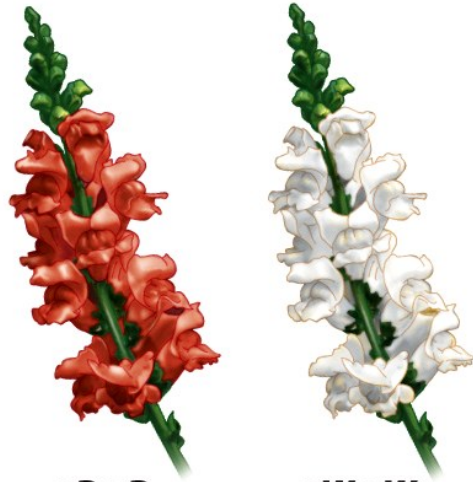
The genotypes shown in (a) are best explained if we assume that *R/r* alleles segregate independently from the *Y/y* alleles during gamete formation in these *F*₁ plants.

Parent genotypes in the second two-trait cross (between *F*₁ offspring)

These hybrid (non-true-breeding) *F*₁ generation plants, with genotype *RrYy*, produce four different types of gametes, each with a unique combination of *R/r* and *Y/y* alleles.



Intermediate phenotypes arise from incomplete dominance.



$CRCR$
Red flowers

$CWCW$
White flowers



$CRCW$
Pink flowers
Snapdragon

Does this follow Mendel's laws?

The effects of codominant alleles are equally visible.

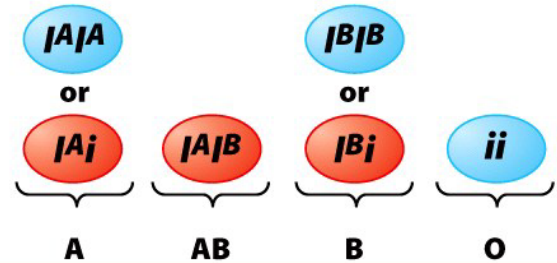


Figure 10.10 Discover Biology 4/e
T. Maehl/Corbis

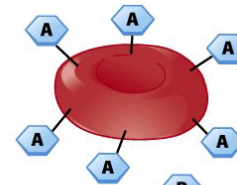
Which alleles of the *I* gene are equally visible?

Genotypes:

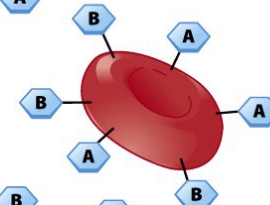
Phenotypes
(blood group type):



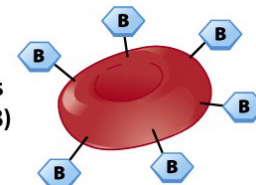
A type sugars
(blood type A)



A and B type sugars
(blood type AB)



B type sugars
(blood type B)



Neither A nor B type sugars
(blood type O)

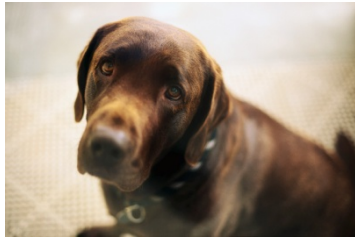


People vary in the
are attached to ce
proteins in their r

Genetics Challenge

Alleles for color in Labrador retrievers show incomplete dominance. Black labs are $C^B C^B$ and yellow labs are $C^Y C^Y$.

1. If chocolate labs are the intermediate phenotype, what would their genotype be?



2. Predict the outcome of a cross between a female chocolate lab and a male yellow lab. Identify the possible genotypes and phenotypes.

Questions?

